

REMARKS

Claims 1-2, 4-7, 9-18 and 21-22 are currently pending. Claims 1-2, 4-7, 9-18, and 21-22 have been rejected. Claim 6 has been canceled without prejudice. Claims 4, 5, 21, and 22 have been amended. Marked up versions of the claims are included in Appendix A. No new matter has been added. Applicants thank the Examiner for the indication that claims 1-2, 4-7 and 9-18 would be allowable if rewritten or amended to overcome the rejections under 35 U.S.C. 112, second paragraph. Applicants respectfully request reconsideration of the above-identified application in view of the above amendments and the following remarks.

Rejection under 35 USC §112

Claims 1-2, 4-7 and 9-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

More specifically, the Examiner states, “Regarding claim 1, the recitation of ‘a line describing a longitudinal edge of each directing element in the first row is substantially tangent to a tip of each directing element in the second row’ is indefinite.” The examiner indicates that the number of directing elements in the first row 17 is greater than the number of directing elements in the second row 18.

Applicants respectfully submit that the Claim 1, as previously filed, provides a definite relationship between directing elements in the first and second rows. The language in claim 1 indicates that there are multiple elongate directing elements in a first row that are related to those in a second row, “wherein a line describing a longitudinal edge of each directing element in the first row is substantially tangent to a tip of each directing element in the second row.” Applicants submit that this limitation does not render the claim indefinite because it, together with the “comprises” transition, does not necessarily require that a fluid conveying tube

has an equal number of directing elements in each row. Rather, it simply and clearly requires multiple elongate directing elements that satisfy the “tangent” limitation set forth in the claim. The claim does not exclude having, for example, in either or both row(s), one or more directing elements that does not satisfy the “tangent” relationship of the above-quoted claim limitation. Accordingly, Applicants submit that claim 1 is definite and therefore respectfully request withdrawal of the Examiner’s rejection on this ground.

Claims 4-6 are also rejected under 35 U.S.C. §112, second paragraph, as being indefinite, for being dependent from canceled claim 3. Applicants have amended claims 4-5 to depend on independent claim 1. Also, Applicants have canceled claim 6 without prejudice or disclaimer. Accordingly, in view of the above amendments, Applicants submit amended claims 4 and 5 are now definite and therefore respectfully request withdrawal of the Examiner’s rejection on this ground.

Rejection under 35 USC §102

Claims 21 and 22 are rejected under 35 U.S.C. 102(b) as anticipated by Applicants’ Prior Art Figures 1-2, Bossart, et al., Rhodes (Figure 7C), Bertrand et al., Tanaka et al., Kamiya or Zeuthen et al. (Larson – GB 521 285).

Applicants have amended claims 21 and 22 to recite elongated directing elements situated in a first row and a second row, wherein a line describing a longitudinal edge of each directing element in the first row is substantially tangent to a tip of each directing element in the second row. Applicants submit that the cited references do not teach or suggest situating the elongated directing elements as recited in claims 21 and 22.

Prior Art figures 1 and 2 illustrate ribs that alternate their orientation along a longitudinal axis of the fluid conveying tube.

The Bossart patent discloses a single rib that extends across the tube as in Figs. 3-6, and 8-10. Bossart also discloses alternating ribs in FIG. 11.

In Fig. 7C, Rhodes discloses a “herringbone” pattern as a possible surface structure for directing elements.

The Bertrand patent teaches a plurality of raised beads disposed along the longitudinal length of the member.

The Tanaka patent discloses a plate and corrugated fins that are placed at in different orientations in different areas of a pipe.

The Kamiya patent discloses a plurality of perpendicular protuberances. As shown in Figs. 1 and 4 of the Kamiya patent, the protuberances are perpendicular to the sides of the tube.

The Zeuthen, et al. (Larson – GB 521 285) patent discloses a series of plates with ribs that are inclined relative to the direction of fluid flow as seen in Fig. 1 of the Zeuthen patent.

In contrast to the cited references, Applicants’ claims 21 and 22 recite, *inter alia*, elongated directed elements situated in a first and a second row substantially parallel, wherein a line describing a longitudinal edge of each directing element in the first row is substantially tangent to a tip of each directing element in the second row. Therefore, Applicants submit that amended claims 21 and 22 are patentably distinct from Prior Art figures 1 and 2, the Bossart patent, Rhodes FIG. 7C, the Bertrand patent, the Tanaka patent, the Kamiya patent, and the Zeuthen patent.

Accordingly, Applicants’ respectfully request the rejections under 35 U.S.C. § 102(b) based on Prior Art Figures 1-2; Bossart, et al.; Rhodes (Figure 7C); Bertrand, et al.; Tanaka, et al.; Kamiya; or Zeuthen, et al. be withdrawn.

CONCLUSION

In view of the above amendments and remarks, Applicant respectfully submits that the application is in condition for allowance. Reconsideration and withdrawal of the Examiner's rejections is respectfully requested and allowance of all pending claims is also respectfully requested.

If any outstanding issues remain, or if the Examiner has any suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number below.

Respectfully submitted,

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APPENDIX A

(Version With Markings To Show Changes Made In The Claims)

IN THE CLAIMS

Please cancel claim 6 without prejudice or disclaimer.

Please amend Claims 4-5, 21, and 22 as follows:

4. (Amended) The fluid conveying tube as claimed in claim [3] 1, wherein at least one end of each directing element of the first row is arranged, seen in the longitudinal direction of the primary surfaces, essentially in alignment with one end of an associated directing element of the second row.

5. (Amended) The fluid conveying tube as claimed in claim [3] 1, wherein the directing elements are laterally relatively offset in the first and second rows.

21. (Amended) Means for effecting heat transfer in a heat exchanger, comprising:
means for introducing a plurality of partial flows into a heat exchanger tube, the tube defining a longitudinal axis and
means for imparting to each of said partial flows a swirling motion about the longitudinal axis, wherein said means for imparting said swirling motion comprises elongated directing elements on said surfaces of said tube, said elongated directing elements are situated substantially parallel in a first row and a second row substantially parallel, wherein a line describing a longitudinal edge of each directing element in the first row is substantially tangent to a tip of each directing element in the second row.

22. (Amended) A method of effecting heat transfer in a heat exchanger, comprising:

introducing a plurality of partial flows into a heat exchanger tube with first and second opposing longitudinal primary heat-exchange surfaces, the tube defining a longitudinal axis and

imparting to each of said partial flows a swirling motion about the longitudinal axis through elongated directing elements situated in a first row and a second row substantially parallel, wherein a line describing a longitudinal edge of each directing element in the first row is substantially tangent to a tip of each directing element in the second row.